Sediment Bedload Transport, Deposition, and Fish Habitat in the San Joaquin River

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Abstract

The goal of the San Joaquin River Restoration is to restore a self-sustaining anadromous Chinook salmon population. This project will compare historic data with current processes of river bedload transport and grainsize distributions monitored from five sites downstream. The end picture will show how spatially differentiated the river bedload transport and habitat are just downstream of Friant dam, which will help dictate how localized river restoration efforts need to be along this critical section of the San Joaquin River.

Introduction

From Lackey, 2003 the future of anadromous salmon populations in the west coast will continue to stay low and possibly decline. It is thought that changes in riverbed grainsizes over time, which influence fish habitat plays a role in essential water structures and vegetation essential for fish to spawn and survive. This study seeks to understand the spatial and temporal sediment bedload characteristics and trends that play a role in fish viability in this section of the San Joaquin River (SJR).

Research Questions

Here, we seek to understand the nature and variability of grainsizes along this section of the river. Currently it is not known how differentiated sediment bedloads, and hence fish habitats, are along the Lower Friant-Wildwood section of the SJR. Based on initial river flow and bedload studies (Figure 2), there appears to be different depositional responses along 4 sites, leaving us to hypothesize that there is a high degree of bedload sediment structure variability along the river. Here, we will test for significant differences and correlations in river structures, vegetation, and bottom bed sediments.

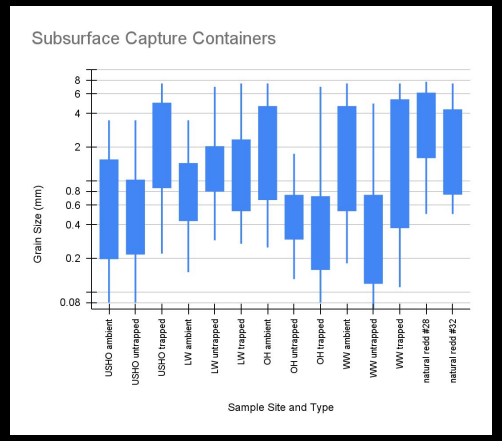


Figure 1. North to south gradient of 50% average D75-D25 grain size. End Whiskers are D5-D95 grain size.

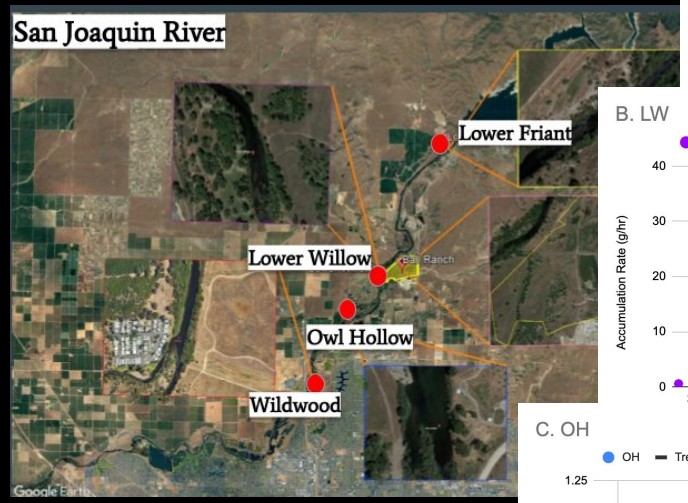
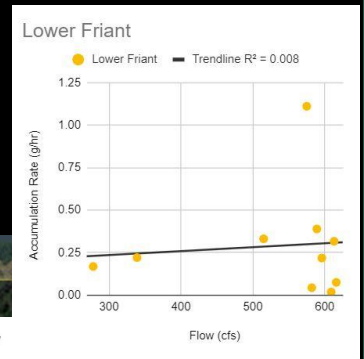
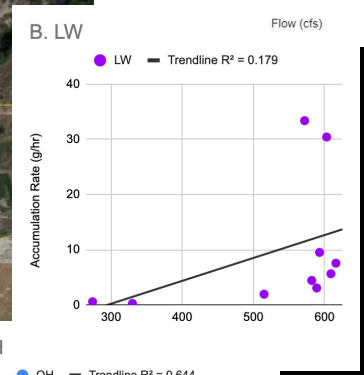
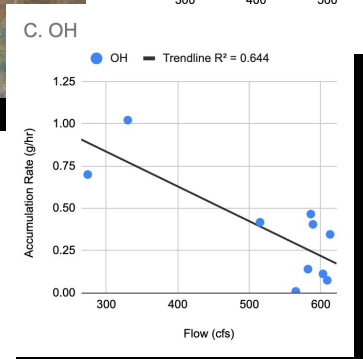
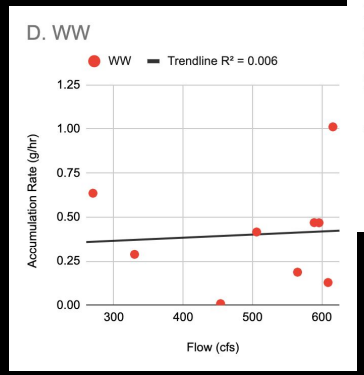


Figure 2. Location map of study. North to south variability gradient of sediment accumulation and flow. Preliminary trend line is weak indicating a lack of correlation between sediment accumulation and river flow.









Primary Methods

Bed Sediment Characterization: Samples will be collected this Summer using the Helly Smith bedload sampler and Nalgene bottles.

River Cross Sections will identify river structures like pools, riffle, scours, and restorative efforts. Vegetative surveys will also be conducted along the cross sections.

Pebble count will provide a correlation between vegetation and sediment, and artificial structures and sediment correlation

Expected Results

Altogether, results of bed sediments will help us understand how local and unique riverbed habitats are over 10m-1km spatial scale. Findings will be used to help determine how locally customized river restoration efforts need to be in order to more successfully sustain critical habitat for natural and native river species.

Bibliography

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